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Beverage containers and methods of dispensing beverages

Abstract:

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(A) A disposable beverage container 1 comprises a substantially rigid bottle 2 made of an impermeable lightweight plastics material, a lightweight impermeable flexible bag 3 containing a beverage 17 to be dispensed located within the bottle, the bottle having inlet means 9 for operatively connecting in use the region 20 defined between the flexible bag and the walls of the bottle to a duct 19 providing a pressurised fluid, and outlet means 10 communicating with the interior of the flexible bag, the beverage being forced in use from the bag through the outlet means under the pressure resulting from the pressurised fluid in the region between the bag and the bottle walls. The connector 9 is non-sealing such that, when duct 19 is disengaged from connector 9, the region 20 is open to atmosphere.

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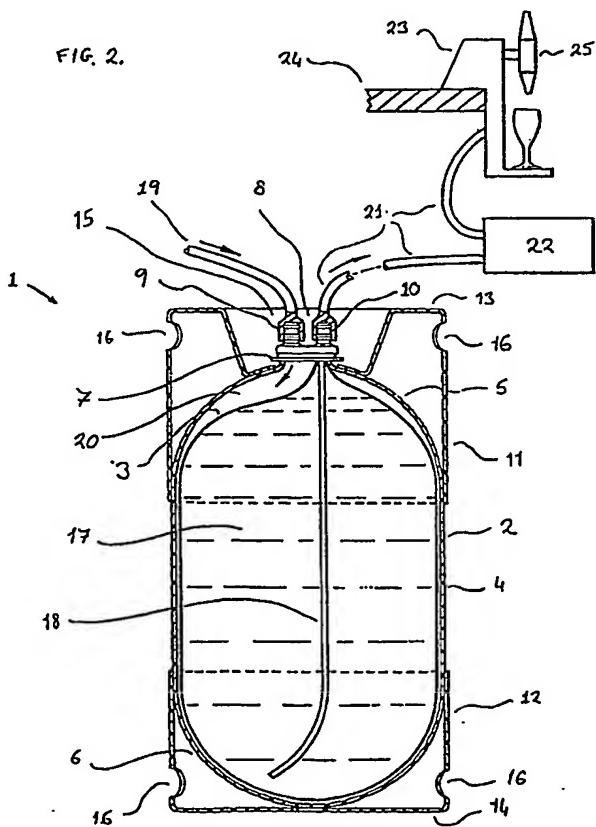
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## (54) Beverage containers and methods of dispensing beverages

(57) A disposable beverage container 1 comprises a substantially rigid bottle 2 made of an impermeable lightweight plastics material, a lightweight impermeable flexible bag 3 containing a beverage 17 to be dispensed located within the bottle, the bottle having inlet means 9 for operatively connecting in use the region 20 defined between the flexible bag and the walls of the bottle to a duct 19 providing a pressurised fluid, and outlet means 10 communicating with the interior of the flexible bag, the beverage being forced in use from the bag through the outlet means under the pressure resulting from the pressurised fluid in the region between the bag and the bottle walls. The connector 9 is non-sealing such that, when duct 19 is disengaged from connector 9, the region 20 is open to atmosphere.



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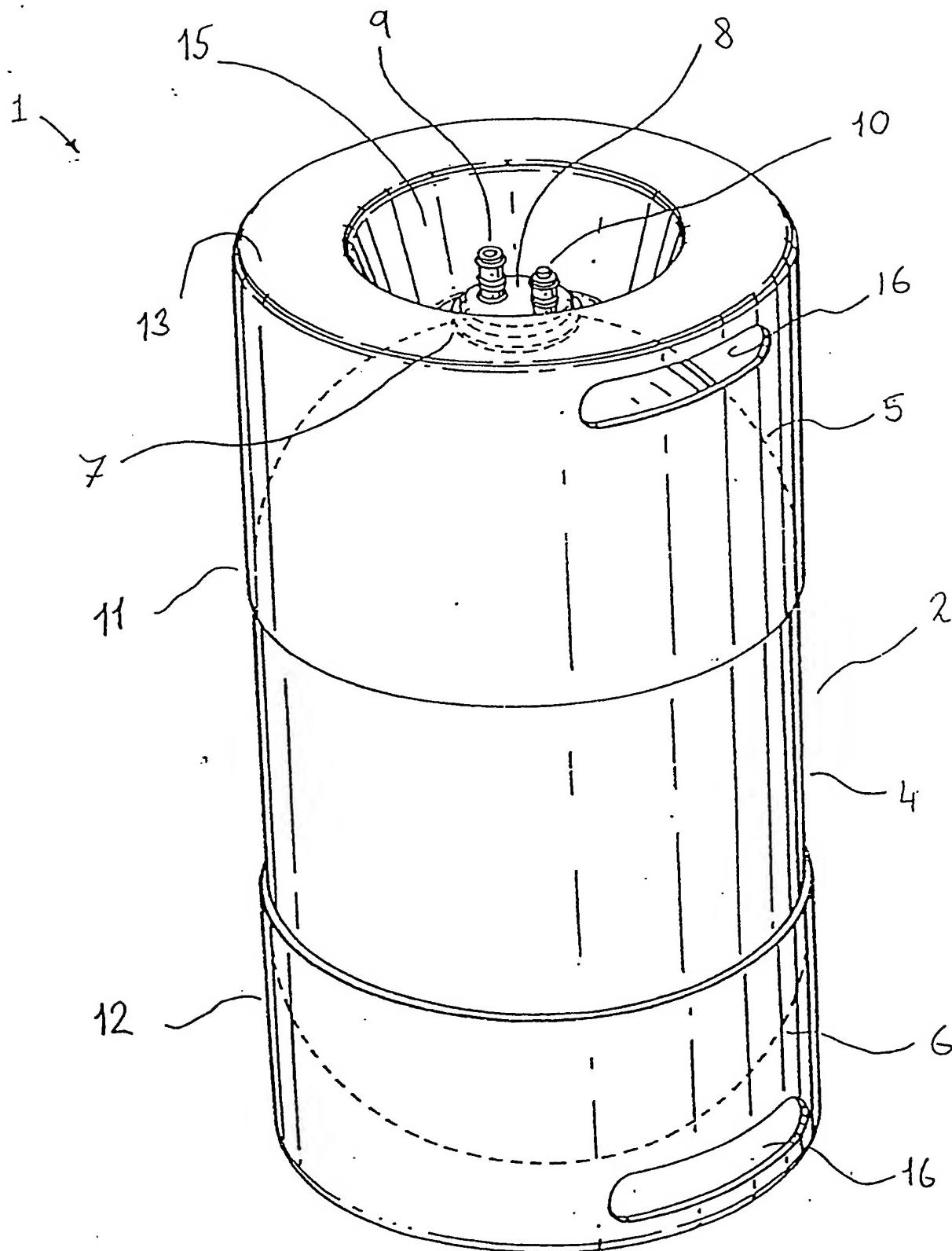
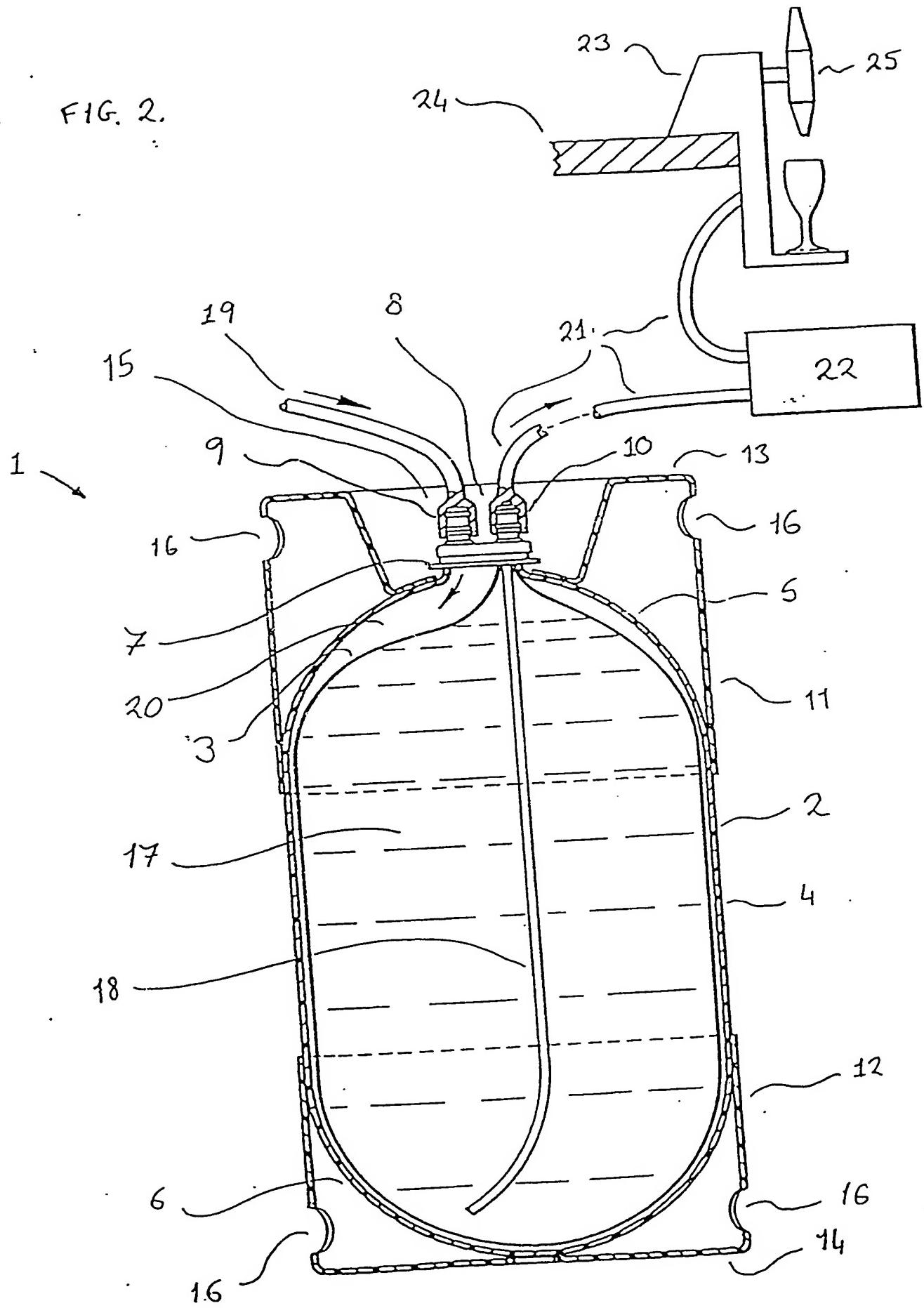


FIG. 1.

FIG. 2.



BEVERAGE CONTAINERS AND METHODS  
OF DISPENSING BEVERAGES

5       The invention relates to beverage containers and to methods of dispensing beverages therefrom. In particular, it relates to beverage containers for sparkling and semi-sparkling wines and methods of dispensing sparkling and semi-sparkling wines.

10      One way of supplying beverages such as sparkling and semi-sparkling wines to public houses, bars and like establishments for sale by the glass is in traditional bottles of about 1 litre capacity, usually made of glass. A problem with supplying beverages in such bottles whose 15 capacity is larger than the measure in which the product is sold, may arise from the fact that not all of the contents of the bottle may be required to be dispensed at any one time. Once the beverage has been exposed to the atmosphere the quality of the product may deteriorate quite rapidly, 20 even if the bottle is resealed. In particular, sparkling or semi-sparkling wines, and indeed wines in general are not well preserved after exposure to the atmosphere.

25      The use of such bottles to supply carbonated beverages and other products which deteriorate on exposure to the atmosphere may therefore on occasion result in a sub-standard or unsaleable product, which is clearly undesirable and wasteful. Furthermore, glass bottles of about 1 litre capacity may be inconveniently small for bulk distribution and are expensive to use on a non-returnable 30 basis.

35      Another way of distributing wines to such establishments is in disposable "bag in box" type cardboard containers. However, such containers are generally of relatively small capacity (typically 3 to 10 litres) and are not suitable for the storage of carbonated beverages and the like which should be stored under pressure, since, unless the bag is completely full, it can inflate as a result of CO<sub>2</sub> released from the beverage with resulting loss

of effervescence and deterioration of quality.

Beverages such as beer and lager are often stored in kegs in direct contact with pressurised carbon dioxide gas and dispensed by means of the carbon dioxide gas pressure.

5 However, contact with carbon dioxide gas adversely affects the character and quality of many beverages, such as still beverages in general, sparkling, semi-sparkling, and still wines, and also some other carbonated beverages such as naturally sparkling mineral waters. In the case of wines,

10 increased carbonation may also contravene customs regulations and result in a higher customs duty becoming payable. Traditional kegs are also supplied to establishments on a returnable basis, and this is not well suited to wine distribution channels which are set up to

15 supply wine in disposable containers. Any change in this respect is generally resisted.

There is a large and expanding market for sparkling and semi-sparkling wines for sale and consumption by the glass in public houses and like establishments and there is therefore a need for a system which allows the dispense of such products "on tap". Due to the nature of the industry which supplies beverages to these establishments and the consequent cost savings, there is a need for a system which allows distribution of products such as sparkling or semi-sparkling wines in bulk non-returnable disposable containers which are easy to handle, transport and store but are able to withstand the rough handling to which they may be subjected.

Viewed from one aspect the present invention provides

30 a method of dispensing a sparkling beverage, comprising: providing a disposable beverage container containing the beverage in the form of a substantially rigid bottle made of an impermeable lightweight plastics material having a lightweight impermeable flexible bag containing the

35 beverage to be dispensed located therewithin, inlet means thereon connectable to a source of pressurised fluid to admit pressurised fluid in use into the region defined between the flexible bag and the walls of the bottle and

adapted to leave the bottle open to the atmosphere on disconnection from a source of pressurised fluid, and outlet means communicating with the interior of the flexible bag through which in use beverage can be  
5 dispensed; connecting the inlet means on the bottle to a source of pressurised fluid to admit pressurised fluid into said region defined between the bag and the walls of the bottle; dispensing beverage from the bag under the pressure exerted by the pressurised fluid therearound through the  
10 outlet means communicating with the bag; and, when substantially all the beverage has been dispensed, disconnecting the inlet means from the source of pressurised fluid, whereby said bottle is left open to the atmosphere; disposing of the container; and continuing the  
15 method with a further beverage container.

Viewed from a second aspect, the present invention provides a disposable beverage container for use as described above, comprising: a substantially rigid bottle made of an impermeable lightweight plastics material; a  
20 lightweight impermeable flexible bag for containing a beverage to be dispensed located within said bottle; inlet means on the bottle connectable to a source of pressurised fluid to admit pressurised fluid in use into the region defined between the flexible bag and the walls of the  
25 bottle; and outlet means including a dip tube communicating with the interior of the flexible bag through which in use beverage can be forced from the bag under the pressure resulting from the pressurised fluid in said region between the bag and the bottle walls; wherein said inlet means is  
30 adapted to leave the bottle open to the atmosphere on disconnection from a source of pressurised fluid.

Such a beverage container and method is suitable for the storage and dispense of a wide range of sparkling beverages, but is particularly well suited to the storage and dispense of sparkling and semi-sparkling wines. Unlike  
35 most known "bag in box" type dispense systems, beverage is forced out under positive pressure which means that inflation of the bag in the case of sparkling beverages

does not occur. Furthermore, with gravity fed "bag in box" systems the beverage in the bag becomes exposed in practice to air let into the bag via the beverage outlet valve or tap after a number of dispenses, with the result that the quality of even still wine deteriorates in time. This may be avoided in accordance with the invention by the contents being at greater than atmospheric pressure and so preventing the ingress of air.

The pressurised fluid which acts as a propellant to dispense the beverage from the flexible bag is confined to the region of the bottle around the outside of the bag and does not contact the beverage. Thus the pressurised fluid may be any fluid, for example air, carbon dioxide or mains water, without a risk of the beverage becoming contaminated or having its character altered. In the case of carbon dioxide there is no possibility of increased carbonation in contravention of customs regulations. The problems associated with dispense of wines and the like from traditional wine bottles for sale by the glass are also avoided.

The beverage container is lightweight, inexpensive to produce and disposable which is advantageous for supplying beverages to public houses and the like. Public houses tend to be at diverse locations and there is a resistance in the wine distribution industry to change to containers such as traditional beer kegs whose cost would lead to collection and return for refilling being an economic requirement. The lightweight nature of the container further facilitates its use as a bulk container holding tens of litres whilst still being relatively manageable and easy to handle.

The bottle is preferably made of a lightweight substantially rigid impermeable plastics material such as P.E.T. In one embodiment a lightweight blown P.E.T. bottle having very thin P.E.T walls is used. The material can be transparent or opaque.

The bottle can have any suitable shape capable of withstanding a sufficient internal pressure. For example

the bottle could be spherical or ovate. In a preferred embodiment the bottle is a cylinder closed by hemispherical end portions. Such is a particularly convenient shape which is well adapted to withstand internal pressure.

5       The impermeable flexible bag may be made of any sufficiently strong lightweight impermeable flexible laminate of plastic films and metal foil and is of the type used in conventional bag in box containers. In one embodiment a laminate of plastic films is coated with

10      metal.

A beverage container having a flexible bag formed of a lightweight impermeable laminate of plastic film and metal foil and a method of dispensing beverages therefrom is the subject of UK Patent Application No.9216646.1 from

15      which the present application is divided.

The bag should preferably be of a size and shape such that when it is filled with a beverage it expands to substantially fill the bottle. The bag is preferably secured to the bottle, in the region where the outlet means communicates with the bag, and arranged such that pressurised fluid between the walls of the bottle and the bag can exert pressure against substantially the entire outer surface of the bag to force the beverage from within. In a particularly convenient arrangement the bag is secured to the bottle at a neck thereof on an axis of symmetry of the bottle.

20      The inlet means is arranged such that when the inlet means is disconnected from a source of pressurised fluid the container is depressurised to atmospheric pressure and can be disposed of safely. This avoids a problem associated with traditional kegs which typically remain pressurised after the beverage has been dispensed and could be hazardous if not returned to the supplier. A one-way valve may be associated with the source of pressurised fluid. The inlet means may have any convenient form, and

30      preferably comprises a non-sealing connector connectable to a source of pressurised fluid through which in use pressurised fluid can be admitted into the region of the

bottle around the outside of the bag.

The outlet means includes an elongate dip tube extending into the bag. To avoid the flow path into the tube becoming blocked as the bag collapses inwardly during the dispense of beverage, the tube is preferably open-sided or is perforated at a plurality of points along its length. The tube is flexible so that it can adapt to the shape of the collapsing bag.

The outlet means preferably includes a resealable two-way outlet valve through which the bag can be filled initially, resealed, and through which beverage can then be dispensed in use. Such an outlet valve may be mounted to the bottle and in one embodiment an outlet valve and inlet connector are combined into a single unit which is mounted to the bottle. In a particularly preferred arrangement, which is convenient to manufacture, such a combined unit which also carries both the dip tube and the flexible bag is secured to the neck of the bottle along the central axis thereof. Preferably an outlet valve is arranged to be opened on connection to a dispense head and closed on disconnection therefrom.

Although the plastic bottle itself may be sufficiently strong to withstand relatively high internal pressures, it may not be so well adapted to withstand impacts such as may result from rough handling. Further, a bottle shape which is suitable for withstanding an internal pressure may not facilitate ease of handling and storage. Thus preferably the beverage container is further provided with a lightweight outer casing which may cover all or part of the bottle, and which may protect the bottle or facilitate easier handling or storage.

The preferred bottle of cylindrical shape and hemispherical ends is provided at its ends with lightweight hollow plastic end cups, which are secured to the bottle for example by adhesive and protect the bottle from impact and rough handling. The end cups preferably have flat end surfaces which allow the container to be free standing and facilitate stacking of one container on top of another.

Thus an internal bottle shape for optimum pressure withstanding is combined, in a simple structure, with an external container shape for ease of handling and storage. In an arrangement in which an inlet connector and/or outlet valve is/are mounted to the neck of the bottle an end cup 5 may be provided with a recessed cut away portion within which the connector and/or valve is/are located so that a connector or valve is protected by the end cup and does not protrude beyond the flat surface of the end cup to 10 interfere with stacking.

Advantageously the end cups may be provided with a raised rim to facilitate safe rolling of the container along the ground and the end cups may be provided with cut away hand holds to permit easy handling.

In one embodiment the bottle and any end cups are 15 enclosed within a protective sleeve formed of any suitable lightweight material, such as cardboard.

The method of the present invention provides a method 20 of dispensing beverages which is compatible with the requirements of modern wine supply channels to public houses and the like. Beverage containers which may have any or all of the features discussed above may be connected in turn to a source of pressurised fluid in a public house or the like for dispense. Each container is disposed of 25 and replaced in turn as substantially all of the beverage contained therein is dispensed.

As discussed above, the pressurised fluid may be any fluid since it does not come into contact with the beverage to be dispensed. Pressurised sources of fluid may be used 30 which do not require a mechanical pump to supply the fluid to the bottles, such as pressurised bottles of gas (e.g. CO<sub>2</sub>, air) or mains water supply. Alternatively a pump may be used to pump a fluid, e.g. air, into the bottles. A pressurised source may be situated near to the bar in a 35 public house and used to continuously dispense beverage as required from successive containers in turn.

Beverage may be dispensed from each container in turn as required to a dispense head situated on a bar for sale

by the glass.

The beverage may be passed through a chilling unit on the way to the dispense head.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, wherein:-

Fig. 1 shows a perspective view of a beverage container according to this embodiment of the invention; and

Fig. 2 shows a schematic sectional view of the beverage container of Fig. 1 in situ in a bar or public house.

The illustrated beverage container 1 is lightweight and disposable and comprises a bottle 2, within which is located a flexible bag 3. Both the bottle 2 and the bag 3 are impermeable. The bottle 2 is a blown P.E.T. bottle having very thin walls and is therefore very lightweight. It has a middle cylindrical portion 4 and is closed at either end by hemispherical portions 5,6. The bottle 2 has a neck 7 at its upper end which is closed by a valve unit 8 mounting a connector 9 and valve 10 to the bottle. The illustrated bottle 2 may have a capacity of 10 to 20 litres.

Hollow cylindrical end cups 11, 12 made of thin lightweight plastic are glued to the hemispherical end portions 5, 6 of the P.E.T. bottle 2 to protect the bottle and facilitate easy handling and storage. The diameter of the end cups is slightly greater than the diameter of the cylindrical portion 4 of the bottle to provide protection for the bottle 2 when the container 1 is on its side. The end surfaces 13, 14 of the end cups are flat to permit the container 1 to stand upright on surface 14 and to allow stacking of one container on top of another. The top end cup 11 is extended vertically beyond the top of the bottle 2 above the valve unit 8 to protect connector 9 and valve 10 and a cut away recess 15 is provided in the flat top 13 to permit access to the connector and valve. Thus the connector 9 and valve 10 do not interfere with stacking.

The end cups 11, 12 are further provided with cut away hand holds 16 in their side walls to facilitate easy handling.

The flexible bag 3 is made of a lightweight laminate of plastic films and metal foil and contains a beverage 17 such as a sparkling or semi sparkling wine. When inflated the bag 3 is of about the same capacity as the bottle 2 and will take up substantially the same shape within the bottle. An elongate open sided flexible dip tube 18 engages as a push fit with valve 10 and extends into the flexible bag 3. The bag 3 is heat welded to a gland (not shown) which is secured around the top of the dip tube 18 such that the bag 3 is firmly secured to the valve unit 8 at the neck 7 of the bottle 2.

Connector 9 is non-sealing (i.e. the inlet is always open) and is connected in use via duct 19 to a source of pressurised fluid such as a cylinder of pressurised carbon dioxide or an air pump, so as to pressurise the region around the bag 3 between the walls of the bottle 2 and the bag 3 by admitting pressurised fluid 20 into that region. The pressurised fluid 20 exerts pressure on the beverage 17 contained within the bag 3. Because pressurised fluid 20 does not mix with beverage 17, any suitable fluid can be used as a pressurised fluid without adversely affecting the character or quality of the beverage or contravening customs regulations. Because connector 9 is non-sealing, when duct 19 is disengaged from connector 9 the region around the bag 3 between the walls of the bottle 2 and the bag 3 is open to the atmosphere.

Valve 10 is a re-sealable two-way outlet valve which is connected in use via duct 21 through a chilling unit 22 to a dispense head 23. The valve 10 is opened on engagement with duct 21 and is closed when the duct 21 is disengaged therefrom. Dispense head 23 is located on a bar 24 of a public house and is operated by a tap 25. The remaining apparatus is located under or near the bar.

In operation the apparatus is used to dispense beverages such as sparkling and semi-sparkling wines through the dispense head 23 for sale and consumption by

the glass. When the tap 25 is opened for dispense, beverage 17 contained in the flexible bag 3 is pressure fed through dip tube 18 and duct 21 to the dispense head 23 under pressure from pressurising fluid 20. The beverage 17 is not exposed to the atmosphere until it is dispensed through tap 25. Over time, as beverage is progressively dispensed from the container 1, the pressurised fluid 20 will be topped up through inlet means 9 and will act to progressively collapse bag 3 around the flexible dip tube 18. The gland (not shown) at the top of the dip tube 18 may prevent complete collapse of the bag around the dip tube, and because the dip tube 18 is elongate and open sided practically all the beverage 17 can be dispensed without the bag collapsing to completely block the outlet flow path. Once substantially all of the beverage has been dispensed the ducts 19 and 21 can be disengaged from the valve unit 8. As connector 9 does not seal any excess pressure will be dispersed and the depressurised container 1 can be disposed of safely, since it is made of inexpensive lightweight plastic disposable materials and is no longer pressurised. It is not necessary to undertake the costly and inconvenient process of returning the container 1 to the supplier for refilling. The container 1 can be replaced by a different container 1' full of beverage and the dispense process can be continued.

Although the beverage container and method of dispensing a beverage have been described particularly in relation to sparkling and semi-sparkling wines, it should be clearly understood that the invention can be usefully applied to a very wide range of beverages, including still and carbonated beverages.

CLAIMS:

1. A method of dispensing a sparkling beverage, comprising: providing a disposable beverage container containing the beverage in the form of a substantially rigid bottle made of an impermeable lightweight plastics material having a lightweight impermeable flexible bag containing the beverage to be dispensed located therewithin, inlet means thereon connectable to a source of pressurised fluid to admit pressurised fluid in use into the region defined between the flexible bag and the walls of the bottle and adapted to leave the bottle open to the atmosphere on disconnection from a source of pressurised fluid, and outlet means communicating with the interior of the flexible bag through which in use beverage can be dispensed; connecting the inlet means on the bottle to a source of pressurised fluid to admit pressurised fluid into said region defined between the bag and the walls of the bottle; dispensing beverage from the bag under the pressure exerted by the pressurised fluid therearound through the outlet means communicating with the bag; and, when substantially all the beverage has been dispensed, disconnecting the inlet means from the source of pressurised fluid, whereby said bottle is left open to the atmosphere; disposing of the container; and continuing the method with a further beverage container.

2. The method of claim 1 wherein the beverage is sparkling or semi-sparkling wine.

30 3. The method of any preceding claim, wherein said step of locating a bag with the bottle includes a step of securing the bag to the bottle in the region where said outlet means communicates with the bag.

35 4. The method of claim 3, wherein the bag is secured to the bottle at a neck thereof on an axis of symmetry of the bottle.

5. The method of any preceding claim, wherein said step of providing an outlet means comprises a step of providing a two-way outlet valve through which the bag can be filled and through which beverage can be dispensed.

5

6. The method of any preceding claim, further comprising the step of passing the beverage through a chilling means prior to dispensing the beverage.

10 7. A disposable beverage container for use with the method of any preceding claim, comprising: a substantially rigid bottle made of an impermeable lightweight plastics material; a lightweight impermeable flexible bag for containing a beverage to be dispensed located within said  
15 bottle; inlet means on the bottle connectable to a source of pressurised fluid to admit pressurised fluid in use into the region defined between the flexible bag and the walls of the bottle; and outlet means including a dip tube communicating with the interior of the flexible bag through  
20 which in use beverage can be forced from the bag under the pressure resulting from the pressurised fluid in said region between the bag and the bottle walls; wherein said inlet means is adapted to leave the bottle open to the atmosphere on disconnection from a source of pressurised  
25 fluid.

8. A beverage container as claimed in claim 7, wherein said dip tube is a flexible dip tube.

30 9. A beverage container as claimed in claim 7 or 8, wherein the flexible bag is formed of a lightweight impermeable laminate of plastic film and metal foil.

35 10. A beverage container as claimed in claim 7, 8 or 9 wherein said bag is secured to said bottle in the region where said outlet means communicates with the bag.

11. A beverage container as claimed in claim 10, wherein

said bag is secured to the bottle at a neck thereof on an axis of symmetry of the bottle.

12. A beverage container as claimed in any one of claims  
5 7 to 11, wherein said outlet means includes a two-way  
outlet valve through which the bag can be filled and  
through which beverage can be dispensed.

13. A beverage container as claimed in any one of claims  
10 7 to 12, wherein said dip tube has one or more openings at  
least part of the way along its length.

14. A beverage container as claimed in any one of claims  
7 to 13, wherein said inlet means and said outlet means  
15 comprise a single unit which is mounted to said bottle,  
wherein said bag is secured to said unit and said unit is  
located in a neck of said bottle.

15. A beverage container as claimed in any one of claims  
20 7 to 14, wherein said bottle includes a substantially  
cylindrical body portion closed by substantially  
hemispherical end portions and is provided at each end with  
a lightweight, hollow end cup enclosing each said  
substantially hemispherical end portion, said end cups  
25 having substantially flat end surfaces.

16. A beverage container as claimed in claim 15, wherein  
a said end cup has an inwardly recessed portion in a said  
end surface, arranged to accommodate a said inlet and/or  
30 outlet means without said means protruding outwardly beyond  
said end surface, and said end cup is further provided with  
a raised rim around each end surface thereof and includes  
one or more hand holds.

35 17. A method of dispensing a sparkling beverage  
substantially as hereinbefore described with reference to  
the accompanying drawings.

18. A disposable beverage container substantially as hereinbefore described with reference to the accompanying drawings.

**Relevant Technical Fields**

(i) UK Cl (Ed.M) F1R (R15A)

(ii) Int Cl (Ed.5) B67D 1/04

Search Examiner  
D DODD

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7 DECEMBER 93

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-  
1-18

(ii)

**Categories of documents**

X: Document indicating lack of novelty or of inventive step.

P: Document published on or after the declared priority date but before the filing date of the present application.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

A: Document indicating technological background and/or state of the art.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	EP 0389191 A1	(LAMBRECHTS) note column 3, lines 39-46; column 5 lines 6-14	1, 7 at least
X	FR 2138685 A	(WEGHSTEEN) note inlet 12, 13 for pressurised fluid	1, 7 at least

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).